

As its name implies, the SDTF has access to Pacific seawater on a continuous basis. Because of this access, most of our test programs are run 24 hours a day and 7 days a week. To the left is our seawater intake structure, which contains tow inlet screens. As shown,

when one inlet is being used, the other is held out of the water allowing complete draining. Every 2 weeks, the inlets are reversed allowing each to be drained completely on a periodic basis. This procedure permits the intake structure to operate continuously, while preventing sealife (in particular mussels and barnacles) from adhering to the inlet screens and piping.

In addition, the SDTF has access to a freshwater pond located nearby. Like all ponds, it contains algae and other natural freshwater constituents. This is an excellent feed source for evaluating freshwater treatment equipment designed for natural waters.



Because of our access to the Pacific Ocean and a freshwater pond, and by using concentrate recirculation techniques, we can attain a wide range of feedwater dissolved solids concentrations.

For more information on the *Seawater Desalination Test Facility* contact:

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#### Partial List of Instrumentation Available at the SDTF:

*Intake Pumps*- Up to 300 gpm.

*Pretreatment Systems*- Multi-media filters, cartridge filters, media filter test bed; assorted chemical feed pumps; nanofiltration, ultrafiltration, and microfiltration equipment can be leased for test programs.

*Cartridge Filter Test Stands*- Two test stands are available for 10 or 20-inch cartridges.

*Flat Sheet Membrane Test Stand*- Three test cells are currently available and more can be installed into standalone test bed.

*4-inch RO Element Test Stand*- One 4 x 40-inch RO element vessels are installed on this standalone test bed.

*Single RO Element Test Stand*- One 6 x 40-inch RO element vessel is installed on this standalone test bed.

*Dual RO Element Test Stand*- This standalone test bed can accommodate two 6 x 40-inch RO element vessels or 8 x 40-inch RO element vessels.

*600 GPH Reverse Osmosis Water Purification Unit (ROWPU) Test Stand*- This standalone test bed can accommodate eight 6 x 40-inch RO element vessels; includes pumps and integral two-stage pretreatment; this test bed system can be modified to evaluate a variety of components.

*1500 GPH Tactical Water Purification System (TWPS) Test Stand*- This standalone test bed can accommodate ten 8 x 40-inch RO element vessels; includes microfiltration pretreatment.

#### Partial List of Instrumentation Available at the SDTF:

*Particle Size Analyzer*

*Turbidimeters*

*Conductivity Meters*

*pH Meters*

*Silt Density Index (SDI) Test Apparatus*

*Variety of Pressure, Flow, and Temperature Instruments*

#### Partial List of Analytical Equipment Available at the SDTF:

*Spectrophotometers (Atomic Adsorption, Infrared, UV/VIS/NIR)*

*X-Ray Spectrometers*

*ICP Emission Spectrometer*

*Gas Chromatograph*

*Scanning Electron Microscope*

*Thermal Gravimetric Analyzer*

NFESC also has Simulated Environmental Test Facilities for specialized testing requirements:

- Seawater Corrosion Facility
- Cold Temperature Test Chamber



# NFESC

*"Specialized facilities engineering and technology"*

## Seawater Desalination Test Facility



*Providing Research, Development,  
Test, & Evaluation Services  
for  
Seawater Desalination Equipment  
June 2002*

**Naval Facilities Engineering Service Center  
1100 23rd Avenue  
Port Hueneme, CA 93043-4370**

The Seawater Desalination Test Facility (SDTF) is located at Port Hueneme, California.

Since 1983, the SDTF has provided facilities, equipment, and support for desalination technology research and development test programs for a wide variety of customers. Past and present customers include all the military services within the DoD and numerous commercial equipment developers. The SDTF is unique because of its data collection capabilities and permanent seawater access for 24-hour operation. Since its beginning, the SDTF has been a key testing resource, especially for the evaluation of reverse osmosis (RO) systems, as well as other technologies related to seawater desalination. In addition, the SDTF provides an excellent test bed for evaluating all water treatment systems and components, especially those designed for the rigors of a seawater environment.



*Seawater Desalination  
Test Facility*

In-facility instrumentation capability includes continuous multiple sampling locations for such parameters as pressure, flow rate, conductivity, turbidity, silt density index, temperature, dissolved oxygen, ORP, and pH. Data are collected and analyzed by SDTF staff who have worked with all types of water treatment processes. Since the SDTF is within the Naval Facilities Engineering Service Center, the Test Facility has access to a full-spectrum water analysis laboratory, as well as a corrosion laboratory, which augments the capabilities whenever necessary.

One of the most important capabilities of the SDTF is its ability to operate desalination equipment using seawater. Being able to evaluate equipment with natural seawater allows data to be collected under “real world” conditions and allows water treatment prototypes

that use new technology to be directly compared to more traditional water treatment equipment. In addition, a wide variety of RO element test beds designed to quantify membrane performance under controlled conditions are available. These test beds can operate continuously with either natural seawater or ASTM synthetic seawater formulations under temperature-controlled conditions maintained for precise measurement of a membrane’s salt rejection, recovery rates, and flux rates.

Test programs recently conducted at the SDTF include evaluation of:

- Filtration equipment: ultrafilters, microfilters, multi-media filters, diatomaceous earth filters and cartridge filters
- RO element arrays
- Energy recovery devices for RO systems
- Fouling and cleaning of RO elements
- Long-term storage of RO elements using preservative chemicals
- High pressure pumps
- Centrifugal separators

Because the SDTF is unique on the West Coast, it is routinely used to perform testing for commercial companies. The SDTF is especially designed to perform the accurate

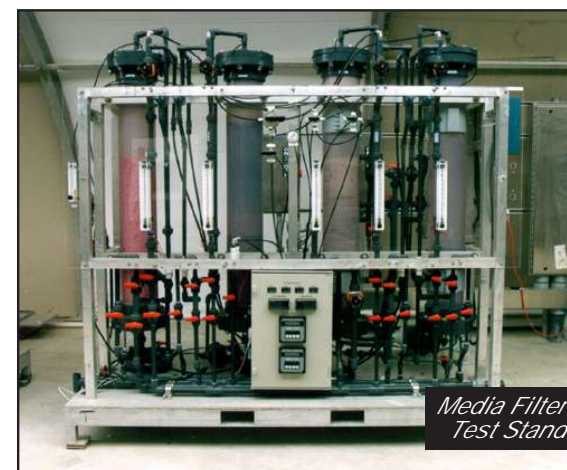


*Microfilters and  
Ultrafilters  
Being Tested*

evaluations necessary to help manufacturers develop marketable products from prototype equipment. During developmental-oriented programs, equipment is operated 24 hours a day, 7 days a week in order to fully document performance by maximizing operating hours and data collection.

An example of the type of work performed in support of commercial companies, the SDTF has helped membrane manufacturers develop a wide variety of new membranes for seawater applications. One RO membrane manufacturer used the SDTF as its primary test and evaluation support over 2 years during development of a new seawater RO membrane. The SDTF has also helped equipment manufacturers develop new components for RO systems. A pump manufacturer developed an energy recovery device for small to moderate sized desalination facilities. Testing at the SDTF made it possible for the manufacturer to optimize the equipment design by operating on natural seawater in a “real world”

setting and receiving immediate performance feedback. This allowed an efficient optimization period that saved time and permitted the final product to be quickly developed. The manufacturer now sells this energy recovery



*Media Filter  
Test Stand*

equipment to customers around the world.

The figures on this page show microfiltration and ultrafiltration membranes being tested as pretreatment for seawater RO systems, as well as one of our test stands used to evaluate and compare all forms of filtration media.

Although the SDTF has a wide variety of test and evaluation capabilities, it has also demonstrated a uniquely efficient form of technology transfer to the commercial sector by providing detailed evaluation and immediate performance feedback for prototype equipment during the crucial optimization phase associated with new product development.